United States Patent and Trademark Office

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,779	08/28/2003	Sang-chul Shin	1293.1961	5852

21171   7590   10/18/2005

STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER
HABERMEHL, JAMES LEE

ART UNIT	PAPER NUMBER
2651	

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/649,779	SHIN, SANG-CHUL
	Examiner	Art Unit	
	James L. Habermehl	2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 June 2005</u>.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-26</u> is/are pending in the application.

　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>5-8,14-17 and 22-26</u> is/are allowed.

6)☒ Claim(s) <u>1-3,9-11 and 18-20</u> is/are rejected.

7)☒ Claim(s) <u>4,12-13, and 21</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　a)☐ All b)☐ Some * c)☐ None of:

　　1.☐ Certified copies of the priority documents have been received.

　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

1.   This Office action is in response to papers filed 7 June 2005, which papers have been

placed of record in the file.

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
> sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 1, 9, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by IBM

TDB Vol. 39, No. 11, pp. 181-182, henceforth known as "IBM." IBM meets all the limitations

of method claim 1, including detecting a voltage applied to a voice coil ("monitoring the VCM

voltage") during a predetermined mode ("powered off"), performing an operation of the value of

the counter-electromotive force using the voice coil voltage ("(2) shocks can be detected by

monitoring the VCM voltage (back-emf) which results from any actuator motion"), comparing

the value of the counter-electromotive force operated with a predetermined threshold ("A

comparator may be used to detect when the VCM voltage crosses a threshold"), when the value

of the counter-electromotive force is equal to or larger than the predetermined threshold,

controlling a voice coil motor and a spindle motor so that a current mode is stopped and a

parking or unloading mode is executed ("which activates the retract system").

       Regarding claim 9, IBM meets all the limitations for similar reasons as above, and also

shows a disk, transducer, voice coil motor, and a spindle motor to rotate the disk (inherently so in

order to render the disk drive functional).

Computer readable storage (medium) claim 18 is drawn to storing the method of

corresponding method claim 1 on a computer readable storage (medium). Claim 18 has

limitations similar to those treated in the above rejection of method claim 1, and they are met by

the reference as discussed above. Therefore claim 18 is rejected for the same reasons of

anticipation as used above to reject claim 1.

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

5.   Claims 1-3, 9-11, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Uchiike et al. in view of Patton et al. Uchiike et al. Figures 1, 3, and 6 show a disc having a

surface, a spindle motor, a read/write transducer with VCM, and detecting a shock event during a

predetermined mode (loading the head) and controlling a voice coil motor and a spindle motor so

that a current mode is stopped and a parking or unloading mode is executed (steps S3/S5/S6).

Uchiike et al. does not show the claimed limitations drawn to using the counter-electromotive

force in the voice coil for detecting the shock.

Patton et al. Figure 3 shows, in the analogous art of shock detection while in a

predetermined disk drive mode, detecting a voltage applied to a voice coil (col. 6, lines 54-62)

during a predetermined mode (col. 6, lines 62-66), performing an operation of the value of the

counter-electromotive force using the voice coil voltage (element 36), comparing the value of the

counter-electromotive force operated with a predetermined threshold (element 39), when the

value of the counter-electromotive force is equal to or larger than the predetermined threshold,

controlling a voice coil motor (element SHK) for the purpose of determining the rotational

component of a shock-caused motion using a system that requires minimal, if any, additional

space within a disk drive housing. It would have been obvious to one of ordinary skill in the art

at the time the invention was made to modify the system of Uchiike et al. to enable use of the

disclosure of Patton et al. of detecting voice coil BEMF, compare the value to a threshold, and

use it when controlling a voice coil motor so that a current mode is stopped and an unloading

mode is executed, the motivation being determining the rotational component of a shock-caused

motion using a system that requires minimal, if any, additional space within a disk drive housing.

Regarding claims 2, 10, and 19 the counter-electromotive force e(t) is obtained by the

disclosed combination at Patton et al. element 36 by $e(t) = v(t) - L \times (di/dt) - R \times i(t)$ as shown

for example in col. 10, lines 58-67 and by using -1 unity gain ratios for the $L \times (di/dt)$ and $R \times$

i(t) components feeding the adder 36.

Regarding claim 3, 11, and 20 the predetermined mode is shown in Uchiike et al. to be a

loading mode.

Computer readable storage (medium) claim 18 is drawn to storing the method of

corresponding method claim 1 on a computer readable storage (medium). Claim 18 has

limitations similar to those treated in the above rejection of method claim 1, and they are met by

the combination of references as discussed above. Therefore claim 18 is rejected for the same

reasons of obviousness as used above to reject claim 1.

6.   Claims 5-8, 14-17, and 22-26 are allowed over the prior art of record. Claims 4, 12-13,

and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if

rewritten in independent form including all of the limitations of the base claim and any

intervening claims. The following is a statement of reasons for the indication of allowable

subject matter:

Claims 4, 12, and 21 are allowable over the prior art of record since the cited references

taken individually or in combination fails to particularly disclose a method of controlling a disk

drive using counter-electromotive force, a disk drive, and a computer readable storage storing at

least one program to control a disk drive using a counter-electromotive force according to a

process comprising calculating the predetermined threshold from a regression function

corresponding to a statistical correlation between the magnitude of an external shock and the

counter-electromotive force, as presented in the environment of claims 4, 12, and 21. It is noted

that the closest prior art, Patton et al., shows controlling a disk drive using counter-electromotive

force similar to the claimed invention. However, Patton et al. fails to disclose calculating the

predetermined threshold from a regression function corresponding to a statistical correlation

between the magnitude of an external shock and the counter-electromotive force as claimed.

Claim 13 is allowable over the prior art of record since the cited references taken

individually or in combination fails to particularly disclose a method of controlling a disk drive

using counter-electromotive force comprising the controller further comprises a circuit to

compensate signal delay between a driving signal to drive the voice coil motor and a voltage

detection signal from the voice coil, as presented in the environment of claim 13. It is noted that

the closest prior art, Patton et al., shows a method of controlling a disk drive using counter-

electromotive force similar to the claimed invention. However, Patton et al. fails to disclose the

controller further comprises a circuit to compensate signal delay between a driving signal to

drive the voice coil motor and a voltage detection signal from the voice coil as claimed.

Claims 5, 14, and 22 are allowable over the prior art of record since the cited references

taken individually or in combination fails to particularly disclose a method of controlling a disk

drive using counter-electromotive force, a disk drive, and a computer readable storage storing at

least one program to control a disk drive using a counter-electromotive force according to a

process comprising applying the detected moving distance variation of the transducer with

respect to the variation in time to a predetermined counter-electromotive force calculation

equation, as presented in the environment of claims 5, 14, and 22. It is noted that the closest

prior art, Patton et al., shows controlling a disk drive using counter-electromotive force similar to

the claimed invention. However, Patton et al. fails to disclose applying the detected moving

distance variation of the transducer with respect to the variation in time to a predetermined

counter-electromotive force calculation equation as claimed.

Claim 26 is allowable over the prior art of record since the cited references taken

individually or in combination fails to particularly disclose a method of controlling a disk drive

using counter-electromotive force comprising calculating the counter-electromotive force,

determining a magnitude of an external shock or a vibration by the calculated counter-

electromotive force, and when the magnitude exceeds a tolerance range, controlling the disk

drive into a parking or unloading mode, as presented in the environment of claim 26. It is noted

that the closest prior art, Patton et al., shows a method of controlling a disk drive using counter-

electromotive force similar to the claimed invention. However, Patton et al. fails to disclose

calculating the counter-electromotive force, determining a magnitude of an external shock or a

vibration by the calculated counter-electromotive force, and when the magnitude exceeds a

tolerance range, controlling the disk drive into a parking or unloading mode as claimed.

7.   Applicant's arguments filed 7 June 2005 have been fully considered but they are not

persuasive.

Regarding applicant's argument that IBM is silent regarding "performing an operation of

the value of the counter-electromotive force using the voice coil voltage" (applicant's response p.

9), the examiner maintains his position for the reasons of record. This includes reliance upon

IBM at "(2) shocks can be detected by monitoring the VCM voltage (back-emf) which results

from any actuator motion" as disclosed above, which is performing an operation (detecting

shock) of the value of the counter-electromotive force (monitoring the back-emf) using the voice

coil voltage (VCM voltage).

Regarding applicant's argument that Uchiike et al. and Patton et al. do not show shock

detection in the loading mode, a seek mode, a follow mode, a read mode, and a write mode

(applicant's response p. 10), applicant is arguing a feature not present in the claims, including

claims 3 and 11. The examiner finds the claim construction met in the alternative of during the

loading mode only and as disclosed by the combination of references as described above.

Regarding applicant's argument that Patton et al. teaches the control process is performed

during track following while Uchiike et al. teaches the control process is performed during

loading (applicant's response p. 10), the examiner relies upon the showing in Patton et al. of use

of VCM back-emf in the art of shock detection during disk drive operation; Uchiike et al. already

performs a form of shock detection during disk drive operation--that operation being loading of

the head. The combination would have been obvious for the reasons given above.

8.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to James L. Habermehl whose telephone number is (571)272-7556.

The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David Hudspeth can be reached on (571)272-7843. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Habermehl/jlh
6 Oct 05

DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600